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YU, LIHONG				
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/581,807

Applicant(s)

DAI ET AL.

Examiner

LIHONG YU

Art Unit

2611

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 June 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 June 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-893)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____
- Paper No(s)/Mail Date 06/02/2006

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-7, 11-16 and 20-26 are rejected under 35 U.S.C. 102(b) as being anticipated by Fukawa et al (US 5,757,845).

Consider claims 1 and 11:

Fukawa discloses a 2D Rake receiver (*see Fukawa at Fig. 6 and col. 9, lines 4, where Fukawa shows an invention for a signal extraction part that has multiple receiving branches*), comprising:

- a control module (*see Fukawa at Fig. 6, item 37*), for generating, according to a reference signal and the radio signals received by a plurality of antenna elements, multi-path information about the radio signals (*see Fukawa at col. 11, lines 60-67 and col. 12, lines 1-6, where Fukawa describes a Coefficient Control Part 37 that is supplied with de-spread signals MPS and a combined signal DCS, that is, a reference signal; Fukawa describes the Coefficient Control Part calculates weighting*

coefficients; see col. 2, lines 16, where Fukawa describes the de-spread signals are from antennas of plural branches; see col. 3, lines 1-21, where Fukawa describes the de-spread signals contain multi-path delayed signal components);

- a weight factor calculating unit (*see Fukawa at Fig. 6, item 37*), for calculating the corresponding weight factors of the received radio signals corresponding to different antenna elements, according to the multi-path information (*see Fukawa at col. 12, lines 1-6, where Fukawa describes the Coefficient Control Part calculates weighting coefficients w1 to w4*);
- a plurality of ID Rake receivers (*see Fukawa at Fig. 6, item 36*), each of which is for receiving radio signals from the corresponding antenna element and weighting the radio signals received by the Rake receiver with the corresponding weight factor (*see Fukawa at col. 11, lines 25-67, where Fukawa describes four receivers, each of the receivers is multiplied by a respective weighting coefficient; Fukawa describes each of the four matched filters in the four receivers has a de-spread code; see col. 2, lines 1-11, where Fukawa describes a de-spread code for each antenna branch*);
- a combining unit (*see Fukawa at Fig. 6, item 15*), for combining the weighted radio signals outputted from the plurality of ID Rake receivers, to output a combined signal (*see Fukawa at col. 11, lines 60-67, where Fukawa describes an adder for outputting the combined signal DCS*).

Consider claim 20:

Fukawa discloses a mobile terminal (*see Fukawa at Fig. 5 and col. 10, lines 30-58, where Fukawa describes an invention for a spread spectrum receiver*), comprising:

- a plurality of antenna elements, each of which is for receiving and transmitting radio signals (*see Fukawa at col. 18, lines 5-21, where Fukawa describes an antenna diversity scheme with two antennas*);
- a 2D Rake receiver, for receiving radio signals from the plurality of antenna elements, and weighting and combining the radio signals received by the plurality of antenna elements into an output signal (*see Fukawa at Fig. 5, item 33, and col. 10, lines 30-58, where Fukawa describes a Signal Extraction Part which consists of a De-spreading/Combining Part 36, and a Coefficient Control Part 37 that generates weighting coefficients for the De-spreading/Combining Part 36*);
- a baseband MODEM unit, for baseband demodulating the output signals of the 2D Rake receiver, and baseband modulating the signals to be transmitted and then transmitting them via the antenna elements (*see Fukawa at Fig. 5, item 34, and col. 10, lines 30-58, where Fukawa describes a Demodulation Part 34 that demodulates the combined signal and feeds a decision signal to the terminal*).

Consider claim 2:

Fukawa discloses the 2D Rake receiver according to claim 1 above. Fukawa discloses every said 1D Rake receiver includes a plurality of Rake fingers, each of which corresponds to the corresponding propagation path and weights its received radio signals with the corresponding

weight factor (*see Fukawa at Fig. 6, and col. 11, lines 25-67, where Fukawa describes a receiver with four matched filters, the output of each matched filter is multiplied by a respective weight*).

Consider claim 21:

Fukawa discloses the mobile terminal according to claim 20 above. Fukawa discloses said 2D Rake receiver includes:

- a control module (*see Fukawa at Fig. 6, item 37*), for generating, according to a reference signal and the radio signals received by said plurality of antenna elements, multi-path information about the radio signals (*see Fukawa at col. 11, lines 60-67 and col. 12, lines 1-6, where Fukawa describes a Coefficient Control Part 37 that is supplied with de-spread signals MPS and a combined signal DCS, that is, a reference signal; Fukawa describes the Coefficient Control Part calculates weighting coefficients; see col. 2, lines 16, where Fukawa describes the de-spread signals are from antennas of plural branches; see col. 3, lines 1-21, where Fukawa describes the de-spread signals contain multi-path delayed signal components*);
- a weight factor calculating unit (*see Fukawa at Fig. 6, item 37*), for calculating the corresponding weight factors of the received radio signals corresponding to different antenna elements (*see Fukawa at col. 12, lines 1-6, where Fukawa describes the Coefficient Control Part calculates weighting coefficients w_1 to w_4*);
- a plurality of ID Rake receivers (*see Fukawa at Fig. 6, item 36*), each of which is for receiving radio signals from the corresponding antenna element and weighting the

radio signals received by the Rake receiver with the corresponding weight factor (*see Fukawa at col. 11, lines 25-67, where Fukawa describes four receivers, each of the receivers is multiplied by a respective weighting coefficient; Fukawa describes each of the four matched filters in the four receivers has a de-spread code; see col. 2, lines 1-11, where Fukawa describes a de-spread code for each antenna branch*);

- a combining unit (*see Fukawa at Fig. 6, item 15*), for combining the weighted radio signals outputted by the plurality of ID Rake receivers, to output a combined signal (*see Fukawa at col. 11, lines 60-67, where Fukawa describes an adder for outputting the combined signal DCS*).

Consider claims 3, 12 and 22:

Fukawa discloses the invention according to claims 2, 11 and 21 above. Fukawa discloses said multi-path information at least includes multi-path delay information and multi-path amplitude estimation information (*see Fukawa at col. 3, lines 1-10, where Fukawa describes the de-spread signal contains multi-path delayed signal components; see col. 11, lines 25-39, where Fukawa describes assuming process gain G_p is 4*).

Consider claims 4, 13 and 23:

Fukawa discloses the invention according to claims 3, 12 and 22 above. Fukawa discloses said weight factor calculating unit calculates the input signals of the corresponding Rake finger in said plurality of ID Rake receivers according to said reference signal and said multi-path information (*see Fukawa at col. 11, lines 60-67 and col. 12, lines 1-6, where Fukawa describes a*

Coefficient Control Part 37 that is supplied with a combined signal DCS, that is, a reference signal), and calculates said corresponding weight factor of the corresponding Rake finger according to the calculation result and the estimated amplitude of the corresponding Rake finger, wherein the corresponding Rake finger is the Rake finger for receiving radio signals transferred from the same propagation path in said plurality of 1D Rake receivers (see Fukawa at col. 3, lines 1-10, where Fukawa describes the de-spread signal contains multi-path delayed signal components; see col. 11, lines 25-39, where Fukawa describes assuming process gain G_p is 4).

Consider claims 5, 14 and 24:

Fukawa discloses the invention according to claims 4 and 13 above. Fukawa discloses said weight factor calculating unit calculates the input signals of said corresponding Rake finger by adopting algorithms based on MMSE (Minimum Mean-Squared Error) rule (see Fukawa at col. 5, lines 25-49, where Fukawa describes using MMSE algorithm).

Consider claims 6, 15 and 25:

Fukawa discloses the invention according to claims 3, 12 and 22 above. Fukawa discloses said weight factor calculating unit calculates the input signals of the corresponding Rake finger according to said multipath information and the output signals of the corresponding Rake finger in said plurality of 1D Rake receiver (see Fukawa at col. 11, lines 60-67 and col. 12, lines 1-6, where Fukawa describes a Coefficient Control Part 37 that is supplied with de-spread signals MPS), and calculates said corresponding weight factor of the corresponding Rake finger according to the calculation result and the estimated amplitude of the corresponding Rake finger, wherein said corresponding Rake finger is the Rake finger for receiving radio signals transferred

from the same propagation path in said plurality of 1D Rake receivers (*see Fukawa at col. 3, lines 1-10, where Fukawa describes the de-spread signal contains multi-path delayed signal components; see col. 11, lines 25-39, where Fukawa describes assuming process gain G_p is 4*).

Consider claims 7, 16 and 26:

Fukawa discloses the invention according to claims 6, 15 and 25 above. Fukawa discloses said weight factor calculating unit calculates the input signals of said corresponding Rake finger with blind adaptive algorithm (*see Fukawa at the abstract and col. 26, lines 45-50, where Fukawa describes the adaptive algorithm is used in the receiver*).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 8, 10, 17 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fukawa et al (US 5,757,845) in view of Iwakiri (US 5,889,815).

Consider claims 8 and 17:

Fukawa discloses the invention according to claims 1 and 11 above. Fukawa discloses said control module generates synchronization control information according to said reference

signal and the radio signals received by said plurality of antenna elements (*see Fukawa at the col. 17, lines 35-52, where Fukawa describes synchronizing signals SY1 and SY2 are generated*).

Fukawa does not disclose a plurality of first-level buffers, for synchronizing the radio signals received by said plurality of antenna elements according to the synchronization control information, so that the radio signals inputted into said plurality of 1D receivers can maintain synchronization.

Iwakiri teaches a plurality of first-level buffers, for synchronizing the radio signals received by a plurality of antenna elements according to a synchronization control information (*see Iwakiri at Fig. 2, items 202, 204, 206, 208, and col. 8, lines 20-52, where Iwakiri describes a Rake receiver with three buffers in the fingers and a time decision unit*).

It would have been obvious to one skilled in the art at the time the invention was made to modify the invention of Fukawa, and to have a plurality of first-level buffers for synchronization purpose, as taught by Iwakiri, thus allowing for reliable services in data transfer, as discussed by Iwakiri (*see Iwakiri at col. 2, lines 60-65*).

Consider claims 10 and 19:

Fukawa in view of Iwakiri discloses the invention according to claims 8 and 17 above. Fukawa discloses said reference signal is pilot information and spreading code (*see Fukawa at col. 25, lines 49-65, where Fukawa describes training signals are inserted in signals; see Fukawa at the abstract and col. 8, lines 11-34, where Fukawa describes using spread code*).

5. Claims 9 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fukawa et al (US 5,757,845) in view of Iwakiri (US 5,889,815), as applied to claims 8 and 17 above, and further in view of Hosur et al (US 6,834,046 B1).

Consider claims 9 and 18:

Fukawa in view of Iwakiri discloses the invention according to claims 8 and 17 above. Fukawa does not disclose said reference signal is downlink synchronization code and midamble code.

Hosur teaches using downlink synchronization code and midamble code in a Rake receiver (*see Hosur at col. 2, lines 16-54*).

It would have been obvious to one skilled in the art at the time the invention was made to modify the invention of Fukawa, and to have downlink synchronization code and midamble code, as taught by Hosur, thus allowing for better synchronizations between based station and users, as discussed by Hosur (*see Hosur at col. 1, lines 63-67 and col. 2, lines 1-25*).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LIHONG YU whose telephone number is (571) 270-5147. The examiner can normally be reached on 8:30 am-7:00 pm Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shuwang Liu can be reached on (571) 272-3036. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Lihong Yu/
Examiner, Art Unit 2611
/Shuwang Liu/
Supervisory Patent Examiner, Art Unit 2611